United States Department of Agriculture
Research, Education, and Economics

# ARS □ ERS □ NASS □ NIFA

# *Policies and Procedures*

| | |
|---|---|
| **Title:** | Dam Safety |
| **Number:** | 650.01 v2 |
| **Date:** | June 20, 2016 |
| **Originating Office:** | Office of the Administrator |
| **This Replaces:** | P&P 650.01 dated 11/10/1980 |
| ***Distribution:*** | All ARS Employees |

**This Policy and Procedures document establishes ARS policy on dam safety, establishes an ARS Dam Safety Officer, outlines duties, responsibilities, and procedures of ARS employees regarding dams and dam safety, and outlines how to obtain qualified assistance regarding ARS dams.**

## Table of Contents

## 1. Purpose

This directive sets forth requirements for an Agricultural Research Service (ARS) Dam Safety Officer (DSO) and policy, roles, and responsibilities regarding dam safety.

## 2. Background

U.S. Department of Agriculture (USDA) Departmental Regulation (DR) 1043-018 establishes a USDA Dam Safety Committee in support of the implementation of the Federal Emergency Management Administration (FEMA) Federal Guidelines for Dam Safety. This committee coordinates and provides leadership to dam safety activities in the Department. It assists in defining needs and in implementing procedures to enhance the safety of the dams under the Agencies' jurisdiction. The committee is concerned with the Agencies' administrative and technical practices related to dam safety including design, construction, operation, maintenance, periodic inspections, and rehabilitation of dams.

DR 1043-018 also requires the ARS Administrator to appoint a DSO, who reports to the Administrator on matters of dam safety, and specifies responsibilities for the position.

This Policies and Procedures (P&P) updates the previous version dated November 10, 1980, which simply specified that the Administrator would designate an Agency DSO. This revision adds policy requirements for the DSO including their duties. In addition, this revision adds requirements for a dam inventory and requirements for locations with dams owned by ARS regarding their classification, inspection, management, and maintenance. This revision also delineates requirements regarding the construction of new dams. Finally, this P&P also now delineates the responsibilities of ARS employees regarding dams and where they can receive qualified assistance.

## 3. Policy

The ARS Administrator will appoint a DSO who will ensure that the Agency, as a matter of policy and in actual practice, makes every reasonable and prudent effort to ensure the safety of the dams owned by ARS. The ARS DSO will represent the Agency on the USDA Dam Safety Committee. The DSO will report to the Administrator on matters of dam safety within ARS.

The DSO will maintain an inventory of those dams owned by ARS based on information provided by ARS Research Leaders (RLs), Location Coordinators (LCs), Laboratory Directors (LDs), and Center Directors (CDs). Locations with ARS-owned dams will ensure that they are properly classified as to hazard potential, maintained and inspected, and will promptly address safety issues. Proper procedures will be followed regarding the approval, design, and construction of new dams.

# 4. Responsibilities

## 4.1 Administrator

The Administrator will appoint the ARS DSO and ensure that sufficient resources are provided to maintain dam safety.

## 4.2 Dam Safety Officer

The responsibilities of the ARS DSO are to:

- See that ARS, as a matter of policy and in actual practice, makes every reasonable and prudent effort to ensure the safety of the dams under ARS jurisdiction;

- Oversee and evaluate the Agency's administrative and technical practices related to dam safety concerning the design and construction of new dams and the operation, maintenance, periodic inspections, or rehabilitation of existing dams;

- Make recommendations for strengthening safety practices and procedures;

- Maintain an inventory of Agency dams;

- Integrate Federal standards and criteria into ARS policy;

- Assist RLs, LCs, LDs, CDs, Area Directors (ADs), and Administrative and Financial Management (AFM) staff in interpreting and applying dam safety standards and regulations;

- To assist RLs, LCs, LDs, CDs, ADs, and AFM staff in obtaining qualified assistance, (i.e. Natural Resources Conservation Service (NRCS) technical engineering support, engineering consultants with expertise in dam design and construction, and state dam safety offices), if necessary; and

- To represent ARS on the USDA Dam Safety Committee.

The DSO is to report directly to the Administrator on matters of dam safety. The officer is to function as an advisor to the Administrator and through the Administrator to the administrative and technical units.

## 4.3 Research Leaders, Location Coordinators, Laboratory Directors, and Center Directors

ARS RLs, LCs, LDs, and CDs who either have a dam listed on the Agency inventory on their locations or are considering constructing one are responsible for:

- Ensuring dams on their locations are properly recorded on the ARS dam inventory;
- Ensuring operation and maintenance procedures for the dam are in place and followed;
- Ensuring that dams on their locations are routinely inspected and maintained;
- Working with the appropriate AFM Business Service Center (BSC) to ensure that proper training is provided regarding the safe operation and maintenance of the dam;
- Developing an Emergency Action Plan (EAP) if the dam is considered a high hazard, and conducting EAP training exercises annually;
- Implementing the EAP if dam safety issues arise;
- Working with their AD, BSC, AFM Facilities Division (FD), and the DSO prior to designing and constructing new dams and the decommission and demolition of existing dams;
- Ensuring that all other aspects of this P&P are properly applied to their locations.

### 4.4 Area Directors

The responsibilities of ARS ADs who have locations in the Area who either have a dam listed on the Agency inventory on their land or are considering constructing one are to:

- Ensure that RLs, LCs ,LDs, and CDs are properly implementing this P&P;
- Prioritize projects in the Capital Project and Repair Plan; and
- Work with FD to ensure that sufficient funds are provided to maintain dam safety.

### 4.5 Business Service Centers

The responsibilities of the BSCs are to provide direct and/or contracted technical expertise for:

- Design and construction of new dams;
- Dam inspections;
- Interpretation of inspection reports including urgency and importance of addressing deficiencies;

- Recommending remedial actions;
- Contracting repairs;
- Assisting locations in developing safe operation and maintenance procedures for their dams;
- Assisting locations in developing EAPs;
- Providing and/or arranging for safety training for safe dam practices, informal inspections, and/or developing EAP tabletop exercises; and
- Following procedures outlined in the EAP when a dam safety issue is reported by the RL, LC, LD, or CD.

### 4.6 Facilities Division

The responsibility of FD is to:

- Oversee the design and construction of new dams;
- Program larger repairs; and
- Work with ADs to ensure that funds are provided to maintain dam safety.

## 5. Dam Inventory

Some dams have greater significance than others because of their potential for affecting public safety. The public concern for the safety of dams is often identified with the size of the dam and reservoir. Because dams, even though small, initially may present no hazard in terms of loss of human life, their degree of hazard can change as a result of downstream development. Because of this, a national inventory of ARS dams must be maintained by the ARS DSO.

USDA DR 1043-018 follows definitions set forth in NRCS National Engineering Manual Subchapter C, Part 520, Subpart C, 520.21, Definitions and Classes such that dams are classified according to the potential hazard to life and property if the dam should suddenly breach or fail. This classification system is consistent with the hazard classification outlined by FEMA (2004a), Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams. Existing and future downstream development, including controls for future development, must be considered when classifying the dam. The classification of a dam is determined only by the potential hazard from failure, not by the criteria.

For consistency with NRCS National Engineering Manual Subchapter C, Part 520, Subpart C 520.21 Definitions and Classes and FEMA Federal Guidelines for Dam Safety (2004b), the following dams must be included in the inventory and are considered as ARS inventory dams:

- All dams with a FEMA Hazard Potential Classification of Significant Hazard or High Hazard (see Section 6.B),

- Low hazard dams more than 6 feet in overall height and with a storage capacity of 50 acre-feet or more, and

- Low hazard dams with an overall height of 25 feet or more and a storage capacity of more than l5 acre-feet.

NOTE: Height is the difference in elevation between the top of the dam and the lowest elevation at the downstream tolerance. Storage capacity is the capacity of the reservoir below the elevation of the crest of the auxiliary spillway or the elevation of the top of the dam if there is no auxiliary spillway.

## 5.1 Content and Maintenance

The FEMA Federal Guidelines for Dam Safety (2004b) define a dam as an artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.

Dam safety is the responsibility of the owner of the dam. While there may be several water impoundments on ARS properties, USDA-DR 1043-018 pertains to only dams owned by ARS that meet one of the definitions outlined in Section 5 and thus, included in ARS Inventory of Dams.

Data maintained in the ARS Dam Inventory will minimally include:

- ARS location and responsible unit;

- Dam name and identification number;

- Description of the location on ARS property including latitudinal and longitudinal coordinates and Congressional District of where it is located;

- Purpose of the dam (i.e., water supply, flood control, grade stabilization, etc.);

- Year of dam construction;

- Description of dam including:
    - Dam type (i.e. earthen and/or structural),
    - FEMA Hazard Potential Classification,
    - Height and length, and
    - Maximum and normal storage;
    - Surface area;
    - Drainage area, and
- Last inspection including:
    - Date,
    - Name of inspector and their employer,
    - Weakness identified, and
    - Status of recommended actions.
    - If high hazard, indicate if an EAP has been developed, and the date it was last updated.

## 5.2 FEMA Hazard Potential Classification

Dams shall be classified according to the FEMA Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams (FEMA 2004a) which sets forth three levels: low, significant, and high. The NRCS National Engineering Manual Subpart C 520.21, Definitions and Classes, elaborates on the definition of FEMA levels resulting in the following definitions to be used by ARS:

- Low Hazard - Dams in rural or agricultural areas where failure may damage farm buildings, agricultural land, or township and country roads.
- Significant Hazard - Dams in predominantly rural or agricultural areas where failure may damage isolated homes, main highways, or minor railroads or interrupt service of relatively important public utilities.
- High Hazard - Dams where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads.

FEMA also provides the following guidance:

| Hazard Potential Classification | Loss of Human Life | Economic, Environmental, Lifeline Losses |
|---|---|---|
| Low | None expected | Low and generally limited to owner and lessee |
| Significant | None expected | Yes |
| High | Probable. One or more expected | Yes (but not necessary for this classification) |

Existing and future downstream development, including controls for future development, must be considered when classifying the dam. The classification of a dam is determined only by the potential hazard from failure. No allowances for evacuation or other emergency actions by the population should be considered because emergency procedures should not be a substitute for appropriate design, construction, and maintenance of dam structures.

## 6. Inspection Procedures

Inspections of installed dams are necessary to ensure that they are functioning properly and safely. Inspections shall accomplish the following:

- Assess the performance of the dam;
- Identify Operation and Maintenance (O&M) and Repair and Modernization (R&M) needs;
- Identify conditions that may threaten life and property;
- Identify any changed conditions that may affect the hazard classification; and
- Develop a schedule to address O&M and R&M needs.

Special, annual, and formal inspections shall be performed by personnel trained in conducting dam inspections. Assistance in dam inspection may be sought from the NRCS State Conservationist for the state where the dam is be located, the state dam safety office, or contracted with a qualified engineering consultant. If an inspection reveals an imminent threat to life or property, the RL, LC, LD, or CD (as appropriate to the location) shall implement the EAP. If the inspection reveals a change in hazard classification (i.e., low hazard to significant or high hazard), the RL, LC, LD, or CD (as appropriate to the location) shall report this immediately to the DSO and the AD.

The following inspections are required:

- Monitoring of dams should be routinely conducted to observe operation and assess performance.

- Special inspections shall be made during or immediately following the occurrence of major events such as floods, earthquakes, tornadoes, vandalism, and the initial filling of a reservoir and as required by State and local authorities.

- Annual inspections shall be performed on all structural components of the dam to determine if they are functioning as designed.

    - A qualified engineer shall assist with the annual inspection and sign/certify the inspection report for at least each of the first 3 years after the dam is installed and accepted by ARS for dams classified as Significant Hazard or High Hazard.

- The downstream floodplain that could be inundated by the failure of all dams classified as Low Hazard and Significant Hazard shall be evaluated at least once every 5 years to determine the proper FEMA hazard classification.

- Formal inspections shall be conducted under the leadership of a qualified engineer at least once every 5 years for all dams classified as Low Hazard and Significant Hazard.

Formal inspection reports shall be submitted to the RL, LC, LD, and CD. Reports indicating serious deficiencies shall be immediately forwarded to the ARS DSO and the AD.

Additionally, an EAP is to be developed for all high hazard dams that are on the national inventory of ARS dams. EAPs should be updated when there are changes in personnel. Updates to EAPs typically follow a guidance of updating every 5 years.

## 7. Obtaining Qualified Assistance

The RL, LC, LD, or CD (as appropriate to the location) shall seek permission for designing and constructing a new dam meeting the definitions outlined in section 5 of this directive from the DSO, AD, and ONP. The proposal for the new dam must provide a clear scientific reason for the need for such structure, a cost estimate for construction of the dam, and a proposed operation and maintenance of the dam. If permission is granted, the proposing RL, LC, LD, or CD shall seek qualified assistance from the NRCS Conservationist for the State where the dam will be located, the state dam safety office, and/or a qualified consulting engineer with experience in dam design and construction. No dam meeting the definitions as outlined in section 5 will be constructed without permission or without the assistance of qualified engineers experienced in dam design and construction.

## 8. Authority

National Dam Safety Program Act of 2014 as part of the Water Resources Reform and Development Act.

## 9. Important Guidance

- Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams (FEMA 2004a)
- Federal Guidelines for Dam Safety (FEMA 2004b)
- NRCS National Engineering Manual Subchapter C, Part 520, Subpart C, 520.21, Definitions and Classes.
- NRCS National Operation and Maintenance Manual, Part 500 – Operation and Maintenance.

## 10. Abbreviations

| | |
|---|---|
| AD | Area Director |
| AFM | Administrative and Financial Management |
| ARS | Agricultural Research Service |
| BSC | Business Service Center |
| CD | Center Director |
| DR | Departmental Regulation |
| DSO | Dam Safety Officer |
| EAP | Emergency Action Plan |
| FD | Facilities Division |
| FEMA | Federal Emergency Management Administration |
| LC | Location Coordinator |
| LD | Laboratory Director |
| NRCS | Natural Resources Conservation Service |
| O&M | Operation and Maintenance |
| R&M | Repair and Modernization |
| RL | Research Leader |
| USDA | U.S. Department of Agriculture |

Approved by: Date of Approval:

_____ _____

Chavonda Jacobs-Young
Administrator